



Electronics Product
Stewardship Canada

DESIGN for ENVIRONMENT REPORT 2022



Message from Electronics Product Stewardship Canada, (EPSC)



Electronics Product Stewardship Canada (EPSC) is pleased to present its 14th Design for Environment Report to highlight the progress made towards reducing the impact of consumer electronics on the environment.

EPSC members are global electronics manufacturers committed to continuously improving product design and business processes in pursuit of sustainability while maintaining an array of high-quality goods and services to meet the needs of consumers.

Electronic products are highly regulated and must adhere to a wide range of legislative frameworks designed to decrease environmental impacts. In Canada, this includes both federal and provincial laws that regulate recycling and resource recovery, the chemicals allowed in products, energy efficiency, recycled content, and more.

Beyond following regulatory requirements, EPSC members demonstrate a commitment to sustainability and the circular economy by undertaking voluntary initiatives such as the Electronic Product Environmental Assessment Tool (EPEAT) ecolabel and by joining global organizations to demonstrate thought leadership in the circular economy.

Increasingly, sustainable business practices are an expectation of consumers, investors, governments, and local communities. Measuring and reporting on progress is important for maintaining transparency and building trust between brands and their customers. EPSC members recognize this growing expectation and have made important commitments to improve environmental outcomes and deliver on those commitments with meaningful progress year-after-year.

By designing for the environment, electronics manufacturers are making a positive impact.

We hope this report is helpful in demonstrating how electronic manufacturers design for the environment by taking into consideration the entire lifecycle of a product.

Shelagh Kerr,
President & CEO, EPSC

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Reducing Weight of Electronics Put on Market

Consumer electronics like smart phones, televisions, and laptops are becoming smaller, lighter, and combine more functions every year. Additional technology innovations, like improved battery life, leads to a reduction in the total weight of electronics put on market, decreased energy use, and fewer carbon emissions.

SAMSUNG

Samsung's first-of-its-kind SolarCell Remote can help eliminate battery waste with a built-in solar panel that can be charged during both day and night.



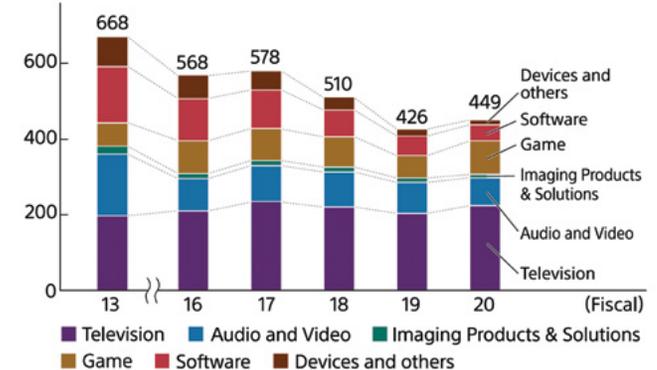
Canon Sustainability Report 2022

In Ontario for example, the Resource Recovery and Productivity Authority (RPRA) reports a 4% decline from 2020 to 2021 in electronics put on market weight¹, despite an increase in the scope of products being registered for resource recovery. Over the past 10 years in Ontario the amount of electronics returned for recycling or reuse has declined from 5.6 kg per capita to 2.2 kg per capita as the impact of lighter products works through the return program.²

Canon's printer, the multifunction office device imageRUNNER ADVANCE DX C5860i, optimizes the thickness of the outer frame and the use of a plastic frame on some units contribute to a weight reduction of more than 25% compared to the previous model.³

Under its targets for minimizing resource inputs, Sony worked to reduce the average mass of products. As a result of continuous efforts to reduce the size and weight of products and packaging in a wide range of product categories, as well as a decrease in the number of units sold, the fiscal 2020 total volume of resources used in products represents an approximate 33% decrease relative to fiscal 2013 levels.⁴

Total Volume of Resources Used in Products (Thousands Tons)



Sony Sustainability Report 2021

Samsung's first-of-its-kind SolarCell Remote can help eliminate battery waste with a built-in solar panel that can be charged during both day and night. The enhanced SolarCell Remote gets electricity from radio frequencies in devices like Wi-Fi routers. This technology will be included in more Samsung products - like new Samsung TVs - with the goal of eliminating the equivalent of more than 200 million batteries from landfills.⁵



SONY

Sony began phasing out brominated flame retardants (BFRs) in circuit boards, casings, and cables starting in 2002, making it one of the first companies in the industry to phase out BFRs.

Lenovo

Lenovo is focused on eliminating halogens from its top-selling products and across as many commodities as possible.

Reducing Substances of Concern

The Strategic Approach to International Chemicals Management (SAICM) identifies transparency about chemicals in global supply chains, including chemicals used in electronics, as an important policy issue due to the potential implications on human health and the environment.⁶ To function properly and to ensure safety for consumers, electronics contain chemicals such as flame retardants and other controlled substances. Understanding when and how in the product lifecycle exposure to substances of concern for manufacturing and recycling workers can occur is important to ensure this risk is mitigated.

EPSC members are reducing the use of chemicals of concern through improved production processes, utilizing safer alternatives as they become available, and phasing out substances where possible.

Sony began phasing out brominated flame retardants (BFRs) in circuit boards, casings, and cables starting in 2002, making it one of the first companies in the industry to phase out BFRs. Since then, Sony has continued the journey and phased out BFRs in all parts, and also phased out chlorinated flame retardants (CFRs), polyvinyl chloride (PVC), as well as phthalates, beryllium, and antimony trioxide in plastic and resin. Going forward, Sony will continue phasing out all brominated and chlorinated compounds as well as antimony.⁷

BFR-Free Product Categories*1	
Xperia™ Smartphone	Video Camera Action Cam
MP3 players WALKMAN®	Digital Still Camera Cyber-shot™
IC recorder / Memory Card Recorder	Interchangeable lens digital camera α™
Portable Radio Recorder / Linear PCM Recorder / Sound Monitoring Receiver	
Video Camera Handycam®	SxS™ memory card

Sony Sustainability Report 2021

TCL strictly abides by the regulations of RoHS, REACH, Prop65, and POPs as well as the halogen-free requirements of the International Electrotechnical Commission (IEC) for equipment. It has formulated and abided by the *Restricted Substance Management Standard* and *Restricted Substance Control Procedure* and followed the principles of replacing high toxicity with low toxicity and replacing low toxicity with non-toxicity to manage and control the use of raw materials.⁸

For more than two decades, HP has worked to move the electronics industry toward safer alternatives to materials of concern. Highlights in 2021 included:

- 83% of personal systems product series are low halogen.
- 45% of EPEAT®-registered personal systems products contain GreenScreen Benchmark 2 or 3 plasticizers and flame retardants.
- About 79% of InkJet printers were shipped without USB cords and many of the others were shipped with shorter cords, avoiding approximately 34 million meters of cords.⁹

Lenovo is focused on eliminating halogens from its top-selling products and across as many commodities as possible. It has phased out halogens in all plastic enclosures, most components, and connectors (except for printed board laminates); all mechanical plastic parts such as product covers, housings, and bezels; many hard disk drives, optical disk drives, solid-state drives; LCD screens; memory, CPUs, chipsets, and communication cards; and other commodities with offerings that meet the iNEMI definition of low halogen.¹⁰





Product Design for Circularity

The circular economy exists when economic activity is decoupled from the consumption of finite resources.¹¹ This type of economy is an essential component of global decarbonization efforts in pursuit of reaching net-zero emissions by 2050. It is estimated that circular economy strategies are needed to address upwards of 45% of global emissions.¹²

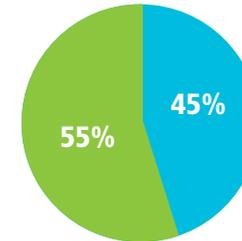


*It is estimated that
circular economy strategies
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45% of global emissions.*

Transitioning from the traditional take-make-waste system of a linear economy requires that products are designed for circularity. This means designing products that produce less waste and pollution, that can be reused and repaired, that are easier to disassemble and recover, and that are made from recyclable or renewable resources that can be reintegrated into new products and components instead of ending up in the waste stream. EPSC members are following the principles of a circular economy and designing products and systems with circularity in mind.

Significant elements of the circular economy to which electronics products contribute are:

- Connected systems to reduce waste through use of data computing
- The 3Rs: Reduce, Reuse and Recycle
- Optimizing product design for disassembly, reuse, recycling, and durability
- Engaging in repair, remanufacturing, refurbishment, smart materials management and providing recycling options for customers
- Providing a market for recycled materials
- Reducing use of energy overall
- Increasing use of renewable energy in manufacturing
- Utilizing technology options to facilitate effective resource utilization and optimization for the circular economy



Emissions reduction measures needed to reach Net-Zero by 2050

- Products strategies, incl. Circular Economy measures
- Renewable energy and energy efficiency

Source: Ellen MacArthur Foundation and Material Economics, 2019

EPSC asks Canadian regulators to facilitate the circular economy by:

- Positioning the circular economy as a global flow of goods rather than as a provincial or Canadian closed economy. The circular manufacturing and remanufacturing economy is global and based on regionally clustered manufacturing and repair/remanufacturing facilities mirroring the global production chain.
- Reducing administrative burden for shipments of products destined for failure analysis, repair, remanufacturing and refurbishment (BASEL Convention Guidelines).
- Facilitating incentives for those who utilize innovative standards focused on effective resource/material utilization and the circular economy (such as EPEAT) rather than overly prescriptive regulations.
- Encouraging and adhering to the use of green procurement practices within the public and private sectors.
- Promoting global harmonization and best practices.

The Ellen MacArthur Foundation has created a business tool called **Circulytics** to help companies become more circular. This measuring tool reveals the extent to which a company has achieved circularity across its entire operations. In addition to measuring circularity performance, this tool helps support decision making and strategy development for circular economy adoption, identifies strengths and areas for improvement, and provides transparency to enhance brand value and create future opportunities.¹³



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Cisco is working to integrate circular economy principles across its business and at every stage of the product lifecycle.

Cisco is working to integrate circular economy principles across its business and at every stage of the product lifecycle. This process starts with circular design, which involves carefully selecting the materials used and choosing recycled and renewable sources where possible. Cisco also designs products and packaging to make it easier for them to be repaired or remanufactured, with the goal of extending their useful lives.¹⁴ Cisco's Unified Computing System (UCS) servers have been engineered to be quickly assembled and disassembled using common tools. Built with modular, easily removable components, UCS products are optimized for repair, reuse, and eventually recycling. The latest generation of UCS-X products takes it a step further, featuring streamlined fastening to speed up the disassembly process, plastic parts made of post-consumer recycled resin, and a 62% reduction in powder coat usage compared to the prior generation.¹⁵

HP has a goal to reach 75% circularity for products and packaging by 2030. In 2021, 39% of HP's products and packaging were circular by weight. HP uses 'Design for Circularity' principles to consider factors impacting sustainability performance throughout the product design and development phases. This reflects how they are designing products and business processes for a circular economy. In 2021, HP won seven Green Good Design Awards for personal systems products. The winning products included laptops and computer monitors: HP Elite Folio, HP Spectre x360 14, HP ProBook 635 Aero G7, HP Renew Sleeve, HP U27 4K Wireless Monitor, HP EliteOne 800 G6 All-in-One, and HP Elite c1030 Chromebook.¹⁶



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At Apple's Material Recovery Lab (MRL), located in an R2-certified facility, they are working on developing better, more efficient means of disassembling products that maximize material recovery, while minimizing waste. The MRL's work assesses the recyclability of products, helping to inform design decisions that support disassembly and recovery.¹⁷

PROGRESS IN 2021 

39%
circular by weight* (this equals the sum of the five metrics below)

32,000 TONNES
of recycled content plastic used in HP products and packaging (3.3% of total materials use)³

105,700 TONNES
of recycled fiber in HP brand paper and packaging (11.1% of total materials use)

227,800 TONNES
of certified sustainably managed fiber in HP brand paper and packaging (23.8% of total materials use)

4,300 TONNES
of recycled content metal used in HP products (0.4% of total materials use)

7,200 TONNES
of reused products and parts (0.8% of total materials use)

Samsung operates an at-home Galaxy Upcycling program whereby a recycled smartphone can be repurposed into a sound sensor, illumination sensor, and notification sender for your current smartphone via the SmartThings app.¹⁸

In 2021, Panasonic operated five circular economy-based business models/products. Over the last three years (2020-2022), Panasonic has successfully used 43.3 Kt of recycled resin in their products.¹⁹

HP 2021 Sustainable Impact Report





Reducing Plastics in Products and Packaging

EPSC members are rethinking how electronic products and their packaging utilize plastics. Companies are introducing innovative ways to reduce single-use plastics in packaging and virgin plastics in their products and packaging by switching to non-plastic alternative materials, by increasing recycled content, and by incorporating ocean-bound plastics.

To use plastics from recovered business products in new products, manufacturers must be able to identify the resins that were used in the original material. For mixed post-consumer electronic take back volumes, this information is not always available.

The Canadian Council of Ministers of Environment (CCME) Action Plan on Zero Plastic Waste states that 90% of plastic waste is not recycled or recovered.²⁰ For the electronics sector, with robust recycling programs in all ten provinces and two territories, the amount of electrical and electronic equipment (EEE), including plastic components, sent to landfill is negligible. Landfill audits indicate that only 0.5% (or less) of landfilled waste is made up of obligated EEE.

In 2021, **Cisco** met and exceeded its 2025 goal to reduce virgin plastic by 20%. The company reduced virgin plastics by 38% due to an increase in the use of recycled plastic and COVID-19 impacts. Cisco remains focused on reducing the use of virgin plastic, facilitating reuse of materials, and increasing the use of recycled plastic by further embedding Cisco's Circular Design Principles throughout the business.²¹

Microsoft reduced single-use plastics in product packaging by 18% or from 5.7% to 4.7% by weight (on average) of plastic per package in 2021. By eliminating just one single-use plastic product, the company was able to eliminate over 500,000 kg of plastic used annually.²²

At **IBM**, 18 single-use plastic packaging elimination and material substitution projects have been identified and are at various stages of investigation and implementation. Two specific projects completed in 2021 were:

- The elimination of stretch wrap (low-density polyethylene) used to protect parts/machines from weather. The estimated annual material savings from implementation of this project is 1.9 MT, or 238,000 linear meters of stretch wrap.
- The qualification and implementation of high-recycled content polyethylene cushions used for IBM z Systems® Power, and storage products. These efforts have reduced the use of virgin packaging materials by 60%. The estimated annual material savings from implementation of this project is 90 MT.²³

Dell has pioneered the use of renewable bioplastic in the lids of the new Latitude 5000 series and Precision 3560/3561 computer laptops. This bioplastic is made from tall oil — a by-product of the papermaking process that Dell is using to accelerate the circular economy.²⁴



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2025 GOAL

Eliminate 75% of single-use plastic packaging by 2025, compared to 2018²⁰



PROGRESS IN 2021

44%

reduction, from an average of 221 grams/unit in 2018 to 124 grams/unit in 2021

HP 2021 Sustainable Impact Report



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Canon

Canon is working to cut the amount of single-use plastic used in product packaging materials and at operational sites.

Panasonic

In 2019, Panasonic developed a composite polypropylene (PP) resin containing plant-derived cellulose fiber as an additive.

HP's goal is to eliminate 75% of single-use plastic packaging by 2025, compared to 2018. In 2021, HP made great progress in meeting this goal with a 44% reduction in single-use plastic packaging, from an average of 221 grams per unit in 2018 to 124 grams per unit in 2021.²⁵ HP's strategy to use plastics responsibly is to:

- Reduce plastic use by making products smaller and removing unneeded plastic from packaging.
- Substitute plastic in packaging where feasible with more sustainable materials such as recycled or certified fiber.
- Replace virgin plastic with recycled plastic wherever possible.
- Source recycled plastic from locations where HP can have positive environmental and social impact, such as ocean-bound plastic.
- Invest in take-back and recycling.²⁶



Practical Initiatives to Reduce Product Packaging Materials (Inkjet Printer TR4650) Canon Sustainability Report 2021

With the aim of reducing plastics, Canon is working to cut the amount of single-use plastic used in product packaging materials and at operational sites. For product packaging, they are seeking to replace single-use plastics, for instance by switching from polystyrene foam to pulp mold.²⁷

TCL promotes the use of more environmentally friendly packaging materials. The packaging materials for its intelligent communication products use soybean ink and paper packaging materials instead of plastic packaging.²⁸

In 2019, Panasonic developed a composite polypropylene (PP) resin containing plant-derived cellulose fiber as an additive. In 2021, through advances in the technology, Panasonic was able to increase the amount of cellulose fiber, and established a process that enables 70% cellulose fiber composition, along with a technology that can smoothly mold the material into products.²⁹

Reuse and Repair

Most electronics products are designed for durability and longevity, whether used by consumers or businesses. Manufacturers provide many services to increase the longevity of products including warranties, professional repair and refurbishment services, as well as software upgrade options.

EPSC members stand behind the quality of their products which are highly regulated to ensure safety, energy efficiency, data security, and minimization of materials of concern to the environment.

Manufacturers offer authorized repair networks to provide consumers with assurance that their products are serviced by properly trained and vetted repair professionals that have the necessary skills to repair electronic products safely and reliably. Some types of repairs can be extremely complicated, and, in some cases, dangerous to perform for those without proper training. It is particularly important that products containing high-energy lithium-ion batteries are repaired only by trained professionals. Authorized repair networks not only include training requirements, but also ensure that only the correct parts and procedures will be used.

Increasing the longevity of products so that they can be reused as much as possible before end-of-life is an important component of facilitating the circular economy for electronics supported by Canadian consumers.



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EPSC members understand the value of reuse and repair and have introduced many initiatives to facilitate the extended use of their products in support of a circular economy and environment.

Through Apple Authorized Service Providers (AASPs), the Independent Repair Provider program, and the upcoming Self Service Repair option announced in 2021, **Apple** continues to design with repairability in mind as an essential element of their commitment to long-lasting devices. For instance, iPhone has continued to improve repairability by increasing the number of repairable modules while also adding durability features like water resistance. The iPhone 12 and iPhone 13 designs, for example, allow for more repairs to be performed at more repair locations than ever before. Now these products' displays, batteries, cameras, speakers, and haptics, among other parts, can be repaired at central locations including retail stores and AASPs.³⁰



Apple's Independent Repair Provider Program expanded to more than 200 countries worldwide in 2021. (Apple Environmental Progress Report)

In March 2022, **Samsung** announced a new self-repair program in collaboration with iFixit, a repair guides and parts website. The program will give Galaxy S20 and S21 series phones and Galaxy Tab S7 Plus customers access to parts, tools, and guides to repair their own devices.³¹

In 2021, **Microsoft's** Design for Repair engineering program helped launch the Surface Pro 8, the Surface Laptop Studio, and Surface Laptop SE, which are considered to be some of the most repairable devices in their product lines with replaceable displays, batteries, keyboards, and more. Microsoft has also established a growing Authorized Service Provider (ASP) network to expand customer repairs across countries including the United States, Canada, Australia, Germany, and France.³²

HP extends product life through design, maintenance, upgrades, repair, and innovative service-based business models. At end of service, the company strives to reuse or recover all products. In 2021, 6.29 million units of HP hardware were repaired (35,300 tonnes) and 2.15 million units of hardware were reused (7,200 tonnes). This represents a 6.8% overall repair and reuse rate of relevant HP hardware sales worldwide.³³

In 2021, **Lenovo** launched its first circular supply chain infrastructure – Lenovo Value Recovery (LVR) – to extend the life of excess, surplus, end-of-life, and withdrawn-from-market products. LVR provides certified refurbished Lenovo data center equipment for its customers. In North America in 2020/2021, 100% of customer returned products with the Infrastructure Solutions Group (ISG) were refurbished, reused, or resold through the LVR business.³⁴

Since 1992, **Canon** has undertaken remanufacturing of used multifunction devices. They collect used devices and break them down into parts, which are washed and cleaned using optimal techniques. Following strict reuse standards, Canon replaces any parts that show wear or deterioration. The production line and inspection processes used are on a par with those for devices made only with new parts. When a remanufactured device is shipped, it is guaranteed to offer the same level of quality as a new product. Canon markets remanufactured devices from the imageRUNNER ADVANCE series under the Refreshed series brand in Japan and under the EQ80 series brand in Europe.³⁵ In 2019, Canon took this further with the launch of the imageRUNNER ADVANCE C3330F-RG, a special environmentally conscious model with an increased reused parts ratio. Through additional special treatments including sandblast polishing to remove the smallest imperfections, Canon has achieved a reused parts ratio of over 90% in this model.³⁶

Panasonic offers laptop users a program called Battery Life Cycle NAVI to extend the lifecycle of its laptops. Through this service, the full-charge battery capacity is automatically monitored and when the capacity deteriorates beyond a specific criterion, a notice is displayed on the laptop screen. The customer can then apply for a new battery, which is sent to them at no extra charge. This enables users to continue enjoying the extended operational hours of a new battery while maintaining their long-used and familiar PC.³⁷



Corporate Commitments

EPSC members have made commitments in pursuit of sustainable development and environmental responsibility. This ensures organizations can measure progress and identify areas for further opportunity to better design for the environment. Below is a sampling of corporate sustainability commitments made by EPSC members.

Company	GHG Goals	Recycling / Circular Economy	Recycled content	Chemicals / Plastics	Energy
Apple	Carbon neutral by 2030.	Eliminate waste sent to landfill from corporate facilities and suppliers.	To one day use only recycled and renewable materials in products and packaging and enhance material recovery.	To eliminate plastics in packaging by 2025.	Transition the entire product supply chain to 100% renewable electricity by 2030.
Cisco	By 2025, reach net zero greenhouse gas emissions for Scope 1 and 2. By 2030, reduce Cisco supply chain-related Scope 3 GHG emissions by 30% absolute. By 2040, reach net zero greenhouse gas emissions for Scopes 1, 2, and 3.	Design 100% of new Cisco products and packaging to incorporate Circular Design Principles by 2025		By 2025, decrease use of virgin plastics by 20%.	By 2022, use electricity generated from renewable sources for at least 85% of global electricity.
Dell	Reduce Scope 1 & 2 GHGs by 50% by 2030. Reach net zero greenhouse gas emissions across Scope 1, 2, and 3 by 2050.	By 2030, for every product a customer buys, Dell will reuse or recycle an equivalent product.	By 2030, 100% of Dell packaging will be made from recycled or renewable material.	By 2030, reduce workplace plastic waste by 90%.	Source 75% of electricity from renewable sources across all Dell Technologies facilities by 2030 — and 100% by 2040.
HP	Reduce HP value chain GHG emissions by 50% by 2030 (compared to 2019), and achieve Net zero emissions by 2040. Reduce HP product-use GHG emissions intensity by 30% by 2025, compared to 2015.	75% circularity for products and packaging by 2030. Recycle 1.2 million tonnes of hardware and supplies by 2025. Reach zero waste in HP operations by 2025.	Use 30% postconsumer recycled content plastic across HP's personal systems and print product portfolio by 2025.	Eliminate 75% of single-use plastic packaging by 2025, compared to 2018.	Use 100% renewable electricity in HP Global operations by 2025

Continued



Corporate Commitments

Company	GHG Goals	Recycling / Circular Economy	Recycled content	Chemicals / Plastics	Energy
IBM	Reach net-zero GHG emissions by 2030.	Divert 90% (by weight) of IBM's total nonhazardous waste from landfill and incineration by 2025.	Ensure essential packaging is designed to be 100% reusable, recyclable, or compostable, or incorporates 30% or more recycled content where technically feasible.	Eliminate nonessential plastic from the packaging of IBM logo hardware by year-end 2024.	Procure 75% of the electricity IBM consumes worldwide from renewable sources by 2025, and 90% by 2030.
Lenovo	By 2030, reduce absolute scope 1 & 2 emissions by 50%.	By 2025, enabled the recycling and reuse of 800 million pounds of end-of-life products By 2025, 90% of PC products plastic packaging and 60% of smartphone packaging will be made from recycled materials	By 2025, 100% of PC products will contain postconsumer recycled content materials By 2025, Lenovo will use 300 million pounds of postconsumer recycled content plastics in products	By 2025, 100% of smartphone products and accessories will be free of PVC and BFR By 2025, Smartphone packaging will use 50% less single-use plastics and reduce in size/volume by 10%.	By 2025, 90% of global operations' electricity will be obtained from renewable sources
Microsoft	Be carbon negative by 2030. Remove historical emissions since 1975 by 2050.	By 2030, be zero waste across Microsoft's direct business. By 2030, Microsoft will design Surface devices, Xbox products and accessories, and all product packaging to be 100% recyclable in OECD countries.		By 2025, eliminate single-use plastics in all Microsoft primary product packaging and all IT asset packaging in datacenters.	By 2030, 100% of electricity consumption will be matched by zero carbon energy purchases 100% of the time.
Panasonic	Reduce CO ₂ emissions from its own operations to virtually net-zero by 2030. Contribute to a total of 300 million tons or more in avoided emissions by 2050.	By 2025, Panasonic will have 13 circular economy-based business models / products.	By 2025, Panasonic will use 90Kt of recycled resin (3-year sum (2023-2025)).		

Continued



Corporate Commitments

Company	GHG Goals	Recycling / Circular Economy	Recycled content	Chemicals / Plastics	Energy
Canon	To achieve net zero CO ₂ emissions for the whole product lifecycle by 2050.				Purchasing 75% of electricity from renewables by 2030 and 100% by 2040.
Samsung	Continue to reduce GHG emissions.	Acquire Zero Waste to Landfill Certification for all manufacturing sites. Collect 7.5 million tonnes of e-waste.			Continue to expand the use of renewable energy.
Sony	Zero Environmental Footprint by 2050	Reduce the use of virgin materials covered by the identified key resources to zero.		Expand use of recycled plastic and promote initiatives to reduce the amount of plastic packaging per product unit by 10% and eliminate plastic packaging from newly-designed small products.	Source 100% renewable electricity for the worldwide operations of the Sony Group by 2040.
TCL 2021	Contribute to China's goal of becoming carbon neutral by 2060.				Reduce electricity use intensity by 13.5% by 2025.



In Canada, over one million tonnes of obligated consumer electronics have been diverted from landfill, due to participation by consumers who return their end of life electronics to recycling systems set up and paid for by electronics manufacturers. Canada has one of the highest rates of electronics recycling in the world. Even with the heavier older equipment now properly recycled, the lighter weight products still amount to over 80,000 tonnes recycled annually.



Extended Producer Responsibility (EPR) or Recycling programs for electronics were introduced in Canada in the mid 2000s with all ten provinces, the Yukon, and the Northwest Territories now having regulated electronics recycling programs.

Recycling and Waste Diversion

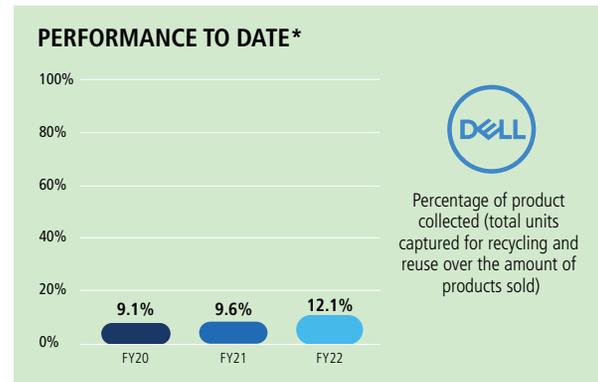
Recycling end-of-life electronics diverts valuable materials from landfills and back into a circular economy. Recycling helps to minimize the need for virgin resources as precious metals, glass, plastics, copper, aluminum, steel, and iron can be recovered from used electronics and recycled into new products.³⁸

Recycling or Extended Producer Responsibility (EPR) programs for electronics were introduced in Canada in the mid 2000s with all ten provinces, the Yukon, and the Northwest Territories now having regulated electronics recycling programs. Many provinces and municipalities have also introduced landfill bans for electronics products to ensure products are properly handled at the end of their useful life.

Electronics manufacturers have been responsibly managing their products at end-of-life for almost two decades across Canada. Recycling is regulated by provinces and territories and each jurisdiction has its own set of requirements that manufacturers must follow which are evolving as jurisdictions look to modernize and improve recycling outcomes.

EPSC members continue to meet and exceed expectations by ensuring electronic products are collected, disassembled, processed, and reintroduced back into the economy through effective collaboration with collectors, processors, producer responsibility organizations, and consumers. EPSC members continue to design for the environment in innovative ways that allows for easier and more efficient recycling of products ensuring that material is diverted from landfill and integrated into new products.

Dell's circular hard drives initiative will now include a closed-loop recycled aluminum solution. In its initial pilot effort, 24,000 drives with closed-loop recycled aluminum were used in select OptiPlex 7090 Small Form Factor and Mini Towers. Aluminum is among the top-five most commonly used materials in the Dell Technologies products. This innovation moves Dell closer to circular metal supply chains.



Dell 2022 ESG Report. Our Purpose in Action

Dell is examining opportunities to scale closed-loop recycled aluminum usage to additional drives, along with other industry uses.³⁹

To maximize the value brought about by resource recycling, **Canon** pursues product-to-product recycling — in other words, recycling used products into new ones. In 1990, Canon launched its Toner Cartridge Recycling Program, the first such program in the industry. The program continues to operate today. Returned used toner cartridges are brought to Canon recycling sites, where they are sorted by model and the reusable parts are picked out. Washing and maintenance are performed as needed, and the parts are then reused in new products. Parts that cannot be reused are crushed and separated by material using physical characteristics such as electrostatic properties and specific gravity. The primary material of toner cartridges is the high impact polystyrene (HIPS) used primarily for the housing. HIPS can be used repeatedly to make new toner cartridges, a unique feature of Canon's closed loop recycling process. Canon conducts used toner cartridge collection in 23 countries and regions (with a cumulative collection volume of about 444,000 tons as of the end of 2021) for recycling at four sites worldwide. As of 2021 they have achieved a cumulative reduction in the use of new resources of approximately 314,000 tons.⁴⁰



In 2021, IBM operations generated 20,700 MT of nonhazardous waste worldwide, including IBM-owned nonhazardous end-of-life machines, parts, and materials, which accounted for 48% by weight of IBM's total nonhazardous waste generated worldwide.

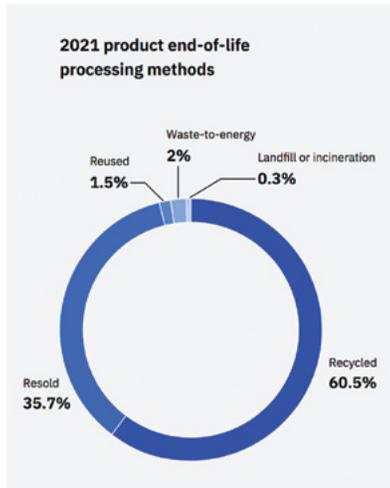


The Canon Automated Recycling System for Toner Cartridges (CARS-T)

Canon has been collecting and recycling used ink cartridges since 1996. As of the end of 2021, Canon's collection program was operational in 35 countries and regions worldwide, and the total volume of cartridges that had been collected up to the end of 2021 reached 2,616 tons.⁴¹

In 2021, Apple made great strides towards their goal of using only responsibly sourced, recycled, and renewable materials for products and packaging. This includes 100% recycled rare earth elements in the magnets of key components across products, such as MacBook Pro, iMac, iPhone 13, iPad (9th generation), Apple Watch Series 7, HomePod mini, and AirPods (3rd generation). The iPhone 13 features 100% recycled gold for major components, including the plating of the main logic board and the wire in the front camera and rear cameras, and every model in the iPad lineup now features 100% recycled aluminum enclosures — bringing the company closer towards its goal of ending reliance on mined materials for products.⁴²

HP provides free and convenient ways to recycle used Original HP Ink and Toner Cartridges through HP Planet Partners Program. Home and commercial customers can return Original HP Ink and Toner Cartridges for free to more than 18,500 authorized sites worldwide to recycle them responsibly.⁴³



IBM 2021 ESG Report, page 46.

Waste Diversion from Landfill

In 2021, IBM operations generated 20,700 MT of nonhazardous waste worldwide, including IBM-owned nonhazardous end-of-life machines, parts, and materials, which accounted for 48% by weight of IBM's total nonhazardous waste generated worldwide. The company diverted 94.2% (by weight) of IBM's total nonhazardous waste from landfill and incineration. Additionally, IBM processed more than 18,000 MT of end-of-life products and product waste, with 97.7% (by weight) reused, resold, or sent for recycling, 2.0% sent to waste-to-energy for final disposition, and 0.3% sent to landfills or for incineration.⁴⁴

Cisco avoided sending approximately 73% of the waste generated globally at its facilities to landfill in 2021. COVID-19 continued to have a significant impact on the total waste generated at these facilities—with the majority of sites closed, Cisco produced significantly less waste than they did pre-pandemic.⁴⁵

Apple introduced its latest recycling machine, Taz, which is designed to recover modules containing rare earth magnets typically lost in conventional shredders, helping improve the overall material recovery rate.

In 2021, HP achieved an 86.4% landfill diversion rate globally, and recovered from HP operations 500 tonnes of used electronic equipment, which were either reused when possible or recycled responsibly through the same programs HP offers to customers.⁴⁶

Use only recycled and renewable materials in our products and packaging, and enhance material recovery



8 products released in fiscal year 2021 with 20 percent or more recycled content



In fiscal year 2021, we more than doubled our use of recycled tungsten, rare earth elements, and cobalt — and introduced certified recycled gold for the first time in an Apple product



Our newest recycling machine, Taz, brings shredding to a new level

Apple Environmental Progress Report 2022, page 33.



Recycled Content

Most plastic products on market today are made with virgin resins derived from fossil resources that are non-renewable.⁴⁷ Utilizing more recycled content in plastic products was endorsed by the CCME as part of Phase 1 of the Canada-wide Action Plan on Zero Plastic Waste.⁴⁸ To improve the sustainability of products and packaging, EPSC members are incorporating more recycled plastic into products and packaging which reduces the need to extract raw materials from the earth and creates a market for recycled materials.



EPSC members are incorporating recycled rare earth minerals, metals, carbon fiber, and gold in product offerings further reducing the sector's reliance on newly mined resources.



Apples Aluminum Recycling program

Another design for the environment initiative being pursued by EPSC members is the inclusion of ocean-bound plastic (OBP) in products and packaging. OBP is plastic waste defined as at risk of ending up in the ocean and accounts for approximately 80% of plastic marine litter. Typically, this is abandoned plastic waste located within 50km from shores where waste management is inefficient or nonexistent.⁴⁹ EPSC members have established collection programs in countries and communities more vulnerable to the generation of OBPs and are finding creative ways to mitigate this environmental problem through product innovation.

In addition to plastic recycled content, EPSC members are incorporating recycled rare earth minerals, metals, carbon fiber, and gold in product offerings further reducing the sector's reliance on newly mined resources.

To introduce everyday sustainability to more products, **Samsung's** Visual Display Business plans to use 30 times more recycled plastics than it did in 2021. Additionally, in 2021, all of Samsung's TV boxes included recycled materials. For 2022, the company revealed that it will be expanding the use of recycled materials to include the boxes' interior packaging as well. Now, recycled materials will be incorporated into Styrofoam, box holders, and plastic bags. Additionally in 2021, Samsung used 33,000 tonnes of recycled plastic from discarded electronic goods, fishing nets, and plastic bottles, reaching a cumulative sum of 310,000 tonnes from 2009.⁵⁰

As a new initiative to drive plastic material recycling, **Canon** Ecology Industry Inc. has developed a filament for 3D printers made with 100% recycled plastic. The recycled plastic raw materials used are PC+ABS and HIPS, which have a record of reliable performance as plastic materials and have been widely used in the outer covers and cassettes of multifunction devices and other applications. Adapting technologies accumulated through recycling of other Canon products, and utilizing optimal technologies to crush and wash the outer covers and cassettes of multifunction devices recovered from the market and then process them through extrusion-molding, enabled filaments with a stable wire diameter to be manufactured even with 100% recycled plastic.⁵¹



Outer cover of multifunction device



Filament for 3D printer

Canon Sustainability Report 2022



DESIGN for ENVIRONMENT REPORT 2022

HP has a goal to use 30% recycled content plastic across its personal systems and print product portfolio by 2025. During 2021, HP used a total of 32,000 tonnes of postconsumer recycled content plastic in HP products, equivalent to 13% of overall plastic use. In addition to recycled plastic use, HP increased the use of other recycled materials including 105,700 tonnes of recycled fiber in HP brand paper and packaging (11.1% of total materials used), 227,800 tonnes of certified sustainably managed fiber in HP brand paper and packaging (23.8% of total materials use), 4,300 tonnes of recycled content metal used in HP products (0.4% of total materials use), and 7,200 tonnes of reused products and parts (0.8% of total materials use).⁵²

Lenovo uses post-consumer recycled content in laptops, desktops, workstations, monitors, and accessories and is introducing a closed loop process in more products each year. In 2020, the company's use of plastics containing recycled content was approximately 5.9 million kilograms. That same year, Lenovo expanded the use of closed-loop post-consumer recycled plastic (CL PCR) to 103 products, up from 66 products the previous year. In 2021, Lenovo also used CL PCR in a server application for the first time in its ThinkSystem SR950 server.⁵³

Dell is driving reclaimed carbon fiber innovations, increasing Dell lifetime usage of reclaimed carbon fiber to 3.8 million pounds. The new Latitude 5000 Series and Precision 3560/3561 laptops use a blend of pre-consumer recycled carbon fiber (20%), post-consumer recycled plastic (30%) and bioplastics (21%), bringing the total recycled and renewable content of the resin to 71% by weight in the lid. In addition, Dell scaled the process to use reclaimed carbon fiber from the aerospace industry within the LCD cover of Latitude 7000 Series laptops, increasing the recycled content from approximately 3% to 5% of the system weight, while enabling about 40 grams of weight reduction and 0.2 mm thickness reduction over the previous generation.⁵⁴



In September 2021, **Apple** introduced iPhone 13, with more certified recycled materials than any previous version of iPhone. This included recycled rare earth elements, tin, tungsten, aluminum, and for the first time, certified recycled gold.



Dell Latitude 5000 series

The new Dell Latitude 5000 series products are made with the industry's most innovative use of sustainable materials in mainstream business laptops with recycled, reclaimed and renewable materials throughout the chassis.

List of sustainable materials:

- Laptop lid – 71% PCR plastic, reclaimed carbon fiber and bio-based plastic⁵⁴
- Palm rest – 35% PCR plastic
- Inner frame – 35% PCR plastic
- Battery frame – 50% PCR plastic
- LCD cover frame – 30% PCR plastic
- AC adapter exterior – 30% PCR plastic
- Fan-housing – 28% ocean-bound plastic
- Laptop base – 20% reclaimed carbon fiber
- Rubber feet – up to 39% bio-based rubber

Dell 2022 ESG Report. Our Purpose in Action

In September 2021, **Apple** introduced iPhone 13, with more certified recycled materials than any previous version of iPhone. This included recycled rare earth elements, tin, tungsten, aluminum, and for the first time, certified recycled gold. Apple also introduced 100% recycled plastic in the mesh of the ear cushions of AirPods Max, as well as 100% recycled aluminum enclosures on every single model in the iPad lineup. In March 2022, Apple introduced 100% recycled copper for the first time in any Apple product: the Apple Studio Display and Mac Studio both use 100% recycled copper in the brass prongs of the power cord plug and AC inlet.⁵⁵



Apple Environmental Progress Report 2022



Recycled Ocean-Bound Plastics

In October 2021, **Microsoft** launched the Ocean Plastic Mouse which has a shell made with 20% recycled ocean plastic, the first consumer electronics application of this material. Going beyond just ocean-bound plastic, each mouse contains resin made from recycled water bottles taken directly out of oceans, beaches, and waterways. The resin is now available for others to use in their own products to help address the global challenge of ocean plastic.⁵⁶

Dell increased the amount of plastic diverted from the oceans by increasing the percentage of ocean-bound plastic content in packaging trays for select new Dell XPS notebooks from 25% to 50%. Packaging trays for select new Dell Latitudes 2-in-1 models continue to contain 25% recycled content derived from ocean-bound plastics. All the additional material used in these packaging trays, regardless of percentage, is sourced from post-consumer recycled-content sources materials.⁵⁷



Dell increased the amount of plastic diverted from the oceans by increasing the percentage of ocean-bound plastic content in packaging trays for select new Dell XPS notebooks from 25% to 50%.



Microsoft's Ocean Plastic Mouse.

Starting in 2016, **HP** has operated a program in Haiti, in partnership with First Mile Coalition and supplier partners, to help tackle the growing challenge of ocean-bound plastics. Since then, HP has used 1,298 tonnes of ocean-bound plastics in products—equivalent to more than 102 million 16.9 ounce (500ml) bottles—preventing this material from reaching waterways and oceans. HP is using ocean-bound plastics in an increasing number of HP products across its portfolio, and have launched more than 300 new products around the world that contain small quantities of ocean-bound plastics since 2017. Examples include:

- Personal systems products such as the HP Pavilion x360 15 Convertible PC (5% OBP in the speaker enclosure) and the HP Z1 Entry Tower G8 (5% OBP in the speaker enclosure and bezel).
- The new Z series, launched in 2021, is the first full series of HP displays to contain OBP, including in large parts such as the stand (5%) and rear cover (5%).
- HP Presence is the world's first conferencing solution made with OBP. HP Presence meeting room solutions contain 5% OBP in the speaker enclosure.
- Exclusively from HP, many Original HP integrated print-head ink cartridges contain OBP (minimum of 5%), validated by UL.⁵⁸

Samsung has developed innovative technologies to recycle waste fishing nets to reduce ocean plastic pollution. The Galaxy S22 series smartphones and Galaxy Tab S8 series tablets are built with parts that contain ocean-bound plastic.⁵⁹



Energy Efficiency & Reduced Greenhouse Gas Emissions



Samsung's efforts to reduce carbon emissions throughout the production cycle have also earned recognition from the Carbon Trust, the world's leading authority on carbon footprint.

The need to reduce global greenhouse gas emissions (GHGs) and limit global warming to well below 2 degrees Celsius compared to pre-industrial levels was recognized by 196 countries who made this commitment by signing the Paris Agreement in 2015.⁶⁰ Governments and industry around the world are working collaboratively to fulfill this commitment. Electronic manufacturers are doing their part by implementing progressive net-zero, carbon neutral, and even carbon negative targets, by introducing innovative design and material selection, and by increasing energy efficiency in products and within company operations.

Reducing GHGs

Samsung's efforts to reduce carbon emissions throughout the production cycle have also earned recognition from the Carbon Trust, the world's leading authority on carbon footprint. Last year, the company's Carbon Trust-certified memory chips helped reduce carbon emissions by nearly 700,000 tons. In addition, by 2025, Samsung plans to make all of its TVs and phone chargers operate on near zero standby power, so that the products will consume almost no energy when not being used.⁶¹

In 2021, **IBM** reduced emissions 61.6% against base year 2010, placing IBM on track to meet its goal (65% reduction by 2025). IBM also established an additional goal to help accelerate GHG emissions reductions in its supply chain. This requires IBM's key suppliers in certain emissions-intensive business sectors to set their own emissions reduction goals that are aligned with scientific recommendations from the UN IPCC.⁶²

Cisco met its previous Scope 1 and 2 goal, to reduce emissions by 60% from fiscal 2007 levels by fiscal 2022, one year early. The Manufacturer has set a new goal of net zero for all global Scope 1 and Scope 2 emissions by 2025.

Products like Cisco 8201 utilizing Silicon One, a programmable application-specific integrated circuit (ASIC) for high-performance networking, are helping the company reduce the energy intensity of its equipment. The Cisco 8201 router is far smaller than its predecessor, the NCS 6008, shrinking from a chassis more than seven feet tall to a single rack unit the size of a pizza box. The Cisco 8201 consumes 96% less energy per year than the NCS 6008, while supplying 35% more bandwidth, as well as being five times more power-efficient than its closest competitor.⁶³

In 2021, **Dell** reduced its product portfolio energy intensity by 76.7% from its 2012 baseline. This goal was established in 2014 as part of the company's Legacy of Good 2020 Plan. This represents a 5.5% point decrease in energy intensity from 2020.⁶⁴

HP's carbon footprint in 2021 equaled 28,459,500 tonnes, which is 9% less than in 2019 primarily due to reductions related to product use resulting from increased energy efficiency and changes to the mix of products sold. Global operations produced 159,500 tonnes of Scope 1 and Scope 2 CO₂e emissions during 2021, a 7% decrease compared to 2020. Since 2019, the energy consumption of HP personal systems products has dropped by 18%, on average. This included average estimated reductions in energy consumption of 27% in notebooks, 40% in workstations, and 18% in displays. Ongoing design improvements in 2021, including more efficient CPUs and power supplies, contributed to continued reductions in the typical energy consumption of notebooks and workstations. Increased sales of Chromebooks and other notebooks, which tend to use less energy than desktop PCs, were also a factor.⁶⁵

In 2021, **Panasonic** successfully added an additional Zero-CO₂ emission factory to their total, bringing them to seven Zero-CO₂ manufacturing sites around the world.⁶⁶

2030 AND 2040 GOALS



Reduce HP value chain GHG emissions by 50% by 2030 (compared to 2019), and achieve net zero emissions by 2040¹

PROGRESS IN 2021

HP's carbon footprint of 28,459,500 tonnes of CO₂e in 2021 was

9% less

than in 2019, primarily due to reductions related to product use resulting from increased energy efficiency and changes to the mix of products sold.

HP 2021 Sustainable Impact Report

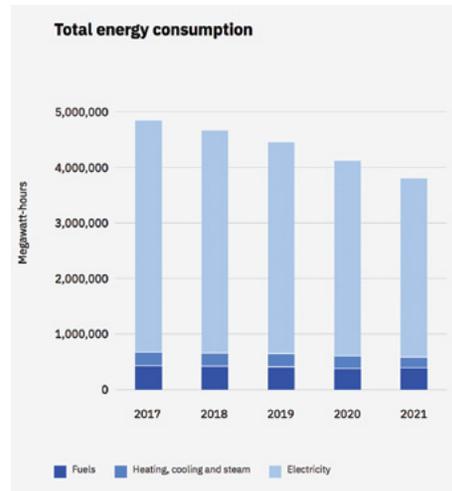


Reduced Energy Use in Manufacturing & Product Energy Efficiency

In 2021, **Apple** continued to improve the carbon efficiency of the integrated circuits used in products. Integrated circuits perform vital functions in electronic devices, yet require significant energy to manufacture. With the Apple M1 chip, Apple created a more efficiently designed chip built specifically for Mac computers. For example, switching to the Apple M1 chip for the 13-inch Mac-Book Pro reduced the energy needed to manufacture and use the device, driving down the product’s carbon footprint by over 8%.⁶⁷



Electronic manufacturers are mitigating negative impacts in water stressed locations by increasing water efficiency in operations, harvesting rainwater, and controlling cooling and heating in buildings.



IBM 2021 ESG Report Addendum: Energy and Climate Change

IBM’s energy use decreased by 7.6% in 2021 from 2020. Global operations consumed approximately 3,804,000 megawatt-hours (MWh) of energy across all commodities, of which 85% was electricity.⁶⁸ The company adjusted schedules for lighting levels, temperature and other building systems to avoid unnecessary consumption of energy during the COVID-19 pandemic, when buildings were underutilized. IBM also implemented projects in data centers to improve the energy efficiency of both cooling and IT equipment, retrofitted lighting, and improved the operational efficiency of building infrastructure.⁶⁹

Reduced Water Use in Manufacturing

Water scarcity is a consequence of the climate crisis. As weather patterns change and temperatures increase, many communities around the world are facing water insecurity. This reality means that reducing water consumption is critical for ongoing sustainable development. Electronic manufacturers are mitigating negative impacts in water stressed locations by increasing water efficiency in operations, harvesting rainwater, and controlling cooling and heating in buildings.

IBM’s water conservation goal is to achieve year-to-year reductions in water withdrawals at larger IBM locations and data centers in water-stressed regions. In 2021, withdrawals at these locations decreased by 1.2% versus 2020. IBM’s primary use of water at locations subject to this goal is cooling and humidity control at offices and data centers (40% of total water withdrawals), irrigation (31% of total water withdrawals), and domestic water use in the workplace (29% of total water withdrawals). In 2021, water withdrawal reduction efforts consisted of installing automatic irrigation systems and decreasing overall landscape irrigation, upgrading cooling tower equipment and water storage tanks, and ongoing maintenance of water pipes. In addition, IBM reused or recycled over 26,500 cubic meters of water for landscape irrigation and to supplement makeup water used in cooling tower systems.⁷⁰

Apple is committed to decouple the amount of freshwater used from the growth in corporate facilities. In fiscal year 2021, Apple saved 133 million gallons of freshwater this fiscal year due to efficiency projects implemented since 2017. At data centers in Maiden, North Carolina, and Reno, Nevada, the company piloted an innovative approach to water treatment. Using a plant-based treatment method for process cooling water, they were able to increase water efficiency, while avoiding chemical usage and reducing discharge. This method also reduces waste since the plant material is compostable.⁷¹



Green Cycle Corporation, a **Sony** Group company that engages in the recycling of waste electronic products, began harvesting rainwater in fiscal 2014 in an effort to reduce its water use.



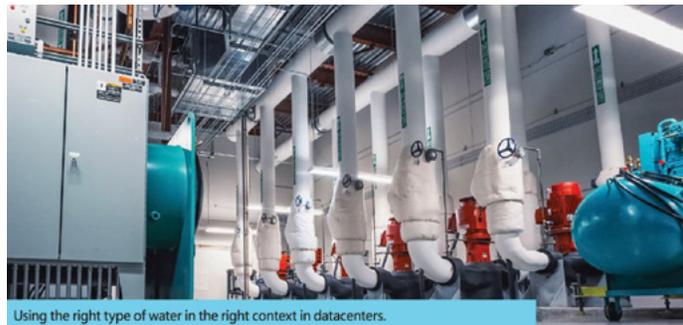
Apple Environmental Progress Report 2022

In 2021, **Dell** decreased the use of freshwater in high water stress locales by 23 megaliters. This represents a 34% decrease in these locales. Furthermore, Dell decreased the use of freshwater in other locales by 197 megaliters. This represents a 15% decrease in these locales compared to the company's 2020 baseline.⁷²

TCL regulates its domestic water use in production facilities and reduces water waste. Each factory improves water use efficiency through equipment improvement, water valve regulation and other measures, and carries out a number of water-saving projects, such as wastewater recycling.⁷³



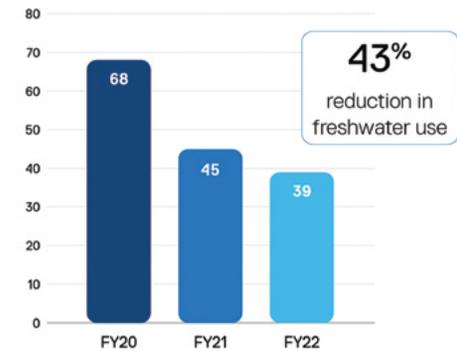
TCL regulates its domestic water use in production facilities and reduces water waste.



Using the right type of water in the right context in datacenters.

Microsoft 2021 Environmental Sustainability Report

Reduction measured from FY20 baseline.



Megaliters of fresh water used in high water stress locales

Dell 2022 ESG Report. Our Purpose in Action

Using less, reusing more, and recycling water across datacenters, Microsoft is using the Smart Water Navigator, which it developed with Ecolab, in its datacenters to prioritize and manage incoming water quality sources like recycled water. In San Antonio, Texas, **Microsoft** has significantly reduced the datacenter's potable water usage, which will now be used to supply water to homes, providing economic as well as environmental benefits. Across operations, Microsoft is testing new techniques, like raising supply air temperatures and harvesting water from rooftops, to further reduce water consumption.⁷⁴

Green Cycle Corporation, a **Sony** Group company that engages in the recycling of waste electronic products, began harvesting rainwater in fiscal 2014 in an effort to reduce its water use. Rainwater was initially tested to confirm that it would not affect the recycling processes and now it is used.⁷⁵



Membership in Sustainability Organizations

As thought leaders in sustainable design and development, EPSC member participate in the global discussion around these important issues through participation in and support for several environmental organizations.

Ellen MacArthur Foundation



The Ellen MacArthur Foundation works to accelerate the transition to a circular economy. We develop and promote the idea of a circular economy, and work with business, academia, policymakers, and institutions to mobilise systems solutions at scale, globally.

Philips is a Strategic Partner; **Microsoft** is a Partner and **Cisco** and **HP** are Members of the Foundations network.

PACE (Platform for Accelerating the Circular Economy):

PACE was created in 2018 by the World Economic Forum and is now hosted by the World Resources Institute.



Since 2018, PACE has become the global collaboration platform for key public and private decision makers to share a vision, best practices, and scale the circular economy together. Nearly 100 leaders from governments, companies and civil society, across continents and sectors, have joined PACE's Leadership Group to help accelerate the transition to a circular economy globally. PACE and its board members call for a global commitment to: Double global circularity in the next 10 years, working towards climate-neutral and inclusive economies.

Philips, Dell, Apple, HP and **Cisco** are all active with PACE

StEP (Solving the E-waste Problem):

UN supported global public-private initiative



StEP envisions being an agent and steward of change, uniquely leading global thinking, knowledge, awareness and innovation in the management and development of environmentally, economically and ethically-sound e-waste resource recovery, re-use and prevention.

Microsoft and **Philips** are StEP members.

GEC (Global Electronics Council) EPEAT



The Global Electronics Council (GEC) is a mission-driven non-profit launched in 2006 and dedicated to creating a more just and sustainable world. Our focus on electronics is due to our recognition that electronics have become increasingly pervasive, finding their way into products within our home, car, clothing, toys, and even the watches we wear. While the technologies that rely on electronics can provide tremendous societal good, they are also the source of significant negative environmental and social impacts.



The Global Electronics Council manages ecolabels to assist purchasers in identifying credible sustainable technology products and services. GEC's EPEAT ecolabel is the leading Type 1 ecolabel covering products and services from the technology sector. It offers purchasers access to more products from a broader range of manufacturers than any other comparable ecolabel.

Products meeting EPEAT criteria are listed on the [EPEAT online registry](#). Among the hundreds of environmental labels in the marketplace today, Type 1 ecolabels are **recognized** by the United Nations Environment Programme as the most reliable. Thousands of businesses, schools, hospitals and governments worldwide trust EPEAT to inform and streamline their purchase of sustainable technology products.

GeSI (Enabling Digital Sustainability)



In collaboration with members from major Information and Communication Technology (ICT) companies and organisations around the world, the Global Enabling Sustainability Initiative (GeSI) is a leading source of impartial information, resources and best practices for achieving integrated social and environmental sustainability through Digital technologies

Dell and IBM are GeSI members

RBA (Responsible Business Alliance)



The Responsible Business Alliance (RBA) is the world's largest industry coalition dedicated to corporate social responsibility in global supply chains.

Members include: **Apple, Asus, Brother, Canon, Ciara, Dell, Fujitsu, HPE, HP, IBM, Lenovo, Lexmark, LG, Microsoft, Oracle, Panasonic, Philips, Ricoh, Samsung, Sony, TCL**

In a truly circular electronics system, all recyclers are seen as the upstream suppliers of materials for manufacturers. This report envisions a circular and ethical supply chain for electronics, where incentives are aligned across the value chain to ensure products and materials circulate at their highest value for as long as possible, and responsible environmental, social, and health and safety practices are assured. The RBA can play a key role in bringing together stakeholders across the electronics value chain, galvanizing the collaboration and innovation required to achieve this vision for a circular electronics system.

World Business Council for Sustainable Development (WBCSD)



WBCSD is the premier global, CEO-led community of over 200 of the world's leading sustainable businesses working collectively to accelerate the system transformations needed for a net zero, nature positive, and more equitable future.

Together, we are the leading voice of business for sustainability, united by our vision of creating a world in which 9+ billion people are living well, within planetary boundaries, by mid-century.

Members include: **Apple, Fujitsu, IBM, LG, Microsoft, Philips**



DESIGN for ENVIRONMENT REPORT 2022

Circular Electronics Partnership



The Circular Electronics Partnership (CEP) will unite leaders in tech, consumer goods and waste management, to identify how to do things better. We aim to reimagine the value of electrical products and materials using a lifecycle approach, reducing waste from the design stage through to product use and recycling. Our vision includes all types of electronic and electrical equipment from six product categories: temperature exchange equipment, screens and monitors, lamps, large equipment, and small IT.

Members include: **Cisco, Dell, HP, Microsoft**

Aluminum Stewardship Initiative



ASI works together with producers, users and stakeholders in the aluminium value chain to collaboratively foster responsible production, sourcing and stewardship of aluminium.

Members include: **Apple**

Clean Electronics Production Network (CEPN)



Clean Electronics Production Network (CEPN) is a multi-stakeholder Innovation Network, formally launched in June 2016 by the Center for Sustainability Solutions to address complex workplace health and safety challenges in the electronics supply chain.

CEPN serves as a platform for collaborative innovation where diverse stakeholders – including technology suppliers, brands, labor and environmental advocates, governments and other leading experts -- work together to understand, address, and eliminate worker exposures to toxic chemicals in electronics production.

Members include: **Apple, Cisco Systems, Dell, HP Inc., Sony**

UN Global Compact



A non-binding global initiative that encourages its participants to align their operations and strategies with universal sustainability principles. To incorporate universal sustainability principles on human rights, labor, environment, and anti-corruption into their business operations and strategies. Has over 19,000 members (including 15,000 corporate members) from 164 countries.

Members: **Samsung**



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Electronics Product Stewardship Canada

About EPSC

EPSC represents the interests of electronics manufacturers for innovation in enhanced end-of-life solutions for electronic products in Canada.

EPSC members have shown environmental leadership by working with stakeholders to create effective environmental stewardship programs across Canada, by investing in design improvements to their products and processes, and by establishing standards for the responsible handling of end-of life electronics.

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